Use of newly selected probiotic bacteria to control enteric infections and improve gut health and performance of piglets

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Why is this project important?

Probiotics have long been used in food animal production, and are widely considered a promising alternative to in-feed antibiotics. There have been a large number of in vivo studies to assess the effect of probiotics on the performance of newly-weaned piglets. While most studies reported positive effects on performance, results have been inconsistent, with some reports describing no effect or even an adverse effect. The inconsistency in the reports indicates the high degree of complexity in the development and application of probiotics. It also highlights the need for scientific research to better understand the mode of action and, particularly, the molecular mechanisms underlying the probiotic effects.

What will researchers do?

- Optimize E. coli induced disease models in weaned piglets in order to produce consistent pig responses through pre-screening.
- Select Bacillus probiotic candidates and optimize encapsulation of probiotics.
- Determine the effects of selected probiotic bacteria and prebiotics on the innate immunity, disease resistance, gut integrity, nutrient absorption and gut microbiome in post-weaning piglets with an E. coli challenge.
- Determine the effect of selected probiotic bacteria on the growth performance of pigs.

What will be the benefit of this research?

The success of this project will contribute to the development of several effective and affordable antibiotic alternatives, including bioactive enzymes and probiotics, to improve weaning pig productivity and reduce overall costs of swine production.

The alternatives and technologies developed from this project will also provide new tools for controlling enteric infections and diarrhea in pigs. In addition, the project will improve our understanding of the molecular mechanisms underlying the functions of the new alternatives, allowing us to maximize their effectiveness in promoting pig gut health and production.

What has been done so far?

As of 2021: The challenge trial conducted at University of Guelph in 2019 was initially planned for year 3 (2020-2021), so that has put the project ahead of schedule. In addition, two clinical trials were conducted under farming conditions to evaluate the effect of vaccination, proteobiotics (compounds that have been demonstrated to interrupt bacteria cell-to-cell communication), and diet on post-weaning E. coli diarrhea. The field and lab work for those two trials have been completed. The analysis of the data is in progress and will continue in year 3.

Collaborators

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Project status

Currently in progress.
Results expected in 2023.

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